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Exploring Sense of Direction: A Comparative Study of Architecture and Fashion Design Students Using the Santa Barbara Sense of Direction Scale

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Abstract: Spatial abilities, including the Sense of Direction (SOD), are vital cognitive skills that shape how individuals navigate and interact with their surroundings. These abilities are especially important for architects, as their work involves designing spaces that are both functional and easy to navigate. This study explores the SOD of architecture and fashion design students in Hyderabad, India, using the Santa Barbara Sense of Direction (SBSOD) Scale. Significant differences were observed between the two groups, reflecting the influence of discipline-specific education and professional training on spatial skills. The study also assessed various constructs within the SBSOD Scale to examine individual differences and preferences. These findings provide valuable insights into the nature of spatial abilities, particularly the sense of direction which is perceived as an innate spatial ability is observed to be influenced by demands of the profession-specific education and training offering implications in the domain of architectural education.

Keywords: *Spatial Abilities; Sense of Direction; Navigation; Wayfinding; Architecture; Fashion Design; Education;Santa Barbara Sense of Direction Scale.*

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I. INTRODUCTION

Spatial abilities, particularly the Sense of Direction (SOD), play a pivotal role in the cognitive processes underlying architectural design. Architects routinely engage in spatial decision-making, which directly impacts how they conceptualize and create built environments that are both functional and navigable. Previous research has emphasized the significance of spatial abilities in shaping spatial cognition, suggesting that an architect's Sense of Direction can influence their capacity to design spaces that are intuitive and user-friendly. However, there remains a gap in understanding the extent to which these abilities are developed through pedagogical methods and professional tasks.

This study investigates the SOD of architecture students to better understand their spatial cognition and its application in design processes. By examining how exposure to discipline-specific training and professional demands contributes to the development of SOD, this research aims to provide insights into the cognitive strengths of architecture students. A comparative approach is adopted, analyzing the SOD of architecture students alongside fashion design students using the Santa Barbara Sense of Direction (SBSOD) Scale. By assessing individual differences and constructs within the SBSOD Scale, the study aims to identify discipline-specific nuances in spatial cognition. Ultimately, these findings contribute to advancing educational practices and understanding the cognitive demands of design-related professions.

II. LITERATURE REVIEW

- *Spatial Abilities, Navigation and Sense of Direction*

Spatial abilities and navigation are fundamental skills that humans rely on daily to interact with their environment [1]. These abilities may be believed to encompass a broad range of cognitive skills including understanding spatial relationships, mental visualization, moving through physical spaces efficiently, and more. Spatial skills are involved in our day-to-day functioning and the very survival, from the most basic of tasks: simply walking through a room without colliding with the furniture, to much more complex ones, such as how to navigate an unfamiliar city or how to plot a route for a road trip.

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In everyday life, strong spatial abilities confer countless benefits, serve to mitigate anxiety in unfamiliar environments, improve time management and enhance decision-making. On the other hand, individuals with weaker spatial skills experience issues like disorientation, increased stress, and reliance on external navigational tools such as maps or navigation apps. These difficulties often limit movement, independence, and quality of life overall.

Moreover, having superior spatial skills has far-reaching effects in human life. They shape how we relate to our environment, as well as how we solve spatial problems and adjust to new or changing environments. For example, having a good spatial ability can help commuters navigate through public transit systems more effectively, travelers explore new cities with confidence, and emergency responders find important locations in the event of a crisis. These abilities may extend beyond an individual's navigational experiences, It is fundamental to careers like architecture, urban planning, engineering and logistics, to name a few, that rely heavily on spatial reasoning.

Navigation, an applied use of spatial abilities, is essential for finding one's way in the world. Whether it is navigating from the grocery store or making a long-distance travel, the ability to navigate not only determines our physical mobility but also brings confidence in exploring a new environment. It allows for autonomy and is an essential aspect of our day-to-day individual interactions, work activities, and leisurely pursuits resulting in overall wellness of humans.

Fundamentally, successful navigation is underpinned by a person's sense of direction [2]. Everyday experience would seem to suggest that some people can easily retrace their way back to a starting point along a route they've only travelled once, while others can do so only with considerable difficulty. This variation between individuals is what is called a 'sense of direction'. Sense of direction, frequently referred to as the awareness of one's position and orientation within the surrounding environment [3], is a commonality essential for effective wayfinding and spatial problem-solving.

Further, a strong sense of direction seems to correlate with an intuitive ability to find one's way, remember routes, and maintain spatial awareness in unfamiliar environments. It also enables people to estimate distances or spatial relationships accurately [4] recall landmarks and utilize them effectively towards navigation [5], develop cognitive maps of their environments [6], remember routes, identify landmarks, and adjust one's path as needed. This skill is not only about navigation—it influences cognitive efficiency, decision-making, and adaptability, and is especially beneficial in ever-changing and complex environments, like urban areas, wilderness trails, or even large indoor venues. Sense of direction is associated with accuracy of cognitive maps [3].

In addition, participants with good sense-of-direction have a very good ability to remember many objects that exist in space and can use these objects as landmarks to organize environmental experiences into an overall layout, but participants with poor sense-of-direction only have a very weak ability in this regard. A good sense of direction is said to be valuable in situations where environmental information is inadequate, for example, when the location of landmarks of interest is to be imagined or when indoors of a building. And a good sense of direction should assist when wayfinding indoors. Buildings often tend to limit views to the outside. Only rarely can vistas be afforded across hall windows, rendering it difficult to monitor travel in a large-scale environment or in relation to a familiar frame of reference [7].

People with a poor sense of direction can have a lot of difficulty in everyday navigation, which can be stressful and affect its efficiency. For example, being unable to drive and navigate unfamiliar surroundings can lead to missed appointments or avoidable travel-related anxiety. Individuals who self-reported having a poor sense of direction were slower and less accurate in pointing tasks of unseen targets [8]. In this sense, a well-developed sense of direction not only allows for independence but also contributes to emotional well-being [9]. Moreover, individuals who have reported a poor sense of direction also stated that they worry about getting lost more than those who report a good sense of direction [8] and that they feel more anxious when lost [3]. Considering the negative emotions and challenges of orienting and wayfinding in individuals with poor sense of direction, one would expect those with poor sense of direction would be more likely to restrict their travel than individuals with good sense of direction.

- *Sense of Direction and Wayfinding Ability*

A critical predictor of wayfinding efficiency is sense of direction, which is defined as ''an awareness of orientation or location'[3] . Good navigators are aware of where they are in relation to their surroundings, which helps explain their better wayfinding abilities. For instance, Prestopnik [10] had participants fill out a sense of direction questionnaire and an exercise indicating the orientation of various starting locations in relation to each end destination. As expected, their accuracy was higher for those with a better sense of direction compared to those with a poor sense of direction. Poor sense of direction seems to be correlated to more navigation errors, as well as more anxiety and reduced mobility [8].

Wayfinding ability varies with age, gender, sense of direction, knowledge of the locality and the wayfinding strategy among individuals [10][11]. Travel to a destination can be mediated not only by processes involved in maintaining a "sense of direction", but also by the physical properties of the environment. Both of these elements exert a significant influence on wayfinding [12].

The self-report, 15-item Santa Barbara Sense of Direction Scale was created by Hegarty [13] to evaluate the role of sense of direction in a range of spatial abilities. As anticipated, as scores on the questionnaire increased, so did accuracy in pointing at hidden landmarks and accuracy in

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pointing to the starting point of a route taken while wayfinding. According to the authors, their comprehensive scale provides details about sense of direction in a variety of contexts, including wayfinding, remaining oriented in an environment, learning layouts, using maps, and giving and following directions (see also [1]).

A similar procedure was used by Hund and Nazarczuk[14], in which participants identified the direction of five locations in a campus building basement and five other locations on campus. Larger errors on this behavioral task correlated with more wayfinding errors and longer navigation time in the basement of the campus building than with participants with smaller sense of direction errors, indicating that this measure of sense of direction relates to wayfinding.

Sense of Direction also seems to be influenced by cultural factors. Non-Western societies that navigate without the assistance of technology often boast an enviably good sense of direction, as in the case of the Polowat islanders of Western Pacific where the people that sail canoes by following the currents and stars. In Bali, where direction assumes a deeper spiritual meaning and 'not knowing which way North is' can be perceived as a symptom of insanity.

- *Sense of Direction and Architectural Experiences*

The significance of sense of direction in architectural experiences is paramount, as it directly influences how individuals navigate and interact with built environments. A well-developed sense of direction enhances user experience by facilitating spatial orientation, improving accessibility, and fostering emotional connections to spaces. This multifaceted relationship between sense of direction and architecture can be explored through various dimensions, including cognitive processes, environmental design, and user engagement.

Cognitive processes are fundamental to understanding how individuals perceive and navigate architectural spaces. Sense of direction involves spatial awareness and the ability to mentally map environments, which are critical for effective navigation. Research by Lin et al. indicates that individuals with a strong sense of direction tend to perform better in tasks requiring spatial memory and orientation, suggesting that cognitive skills play a crucial role in architectural experiences [15]. This cognitive mapping is essential in complex environments, such as hospitals or educational institutions, where users must navigate through intricate layouts to reach their destinations.

Environmental design significantly impacts the sense of direction by shaping how users interact with spaces. Effective architectural design incorporates elements that enhance wayfinding, such as clear signage, landmarks, and intuitive layouts.

Moreover, the emotional connection to space is influenced by the sense of direction. Architectural elements that facilitate navigation can evoke feelings of safety and comfort, which are essential for positive user experiences. Hamdy in her research discusses how interior architectural elements affect human psychology, emphasizing that well-designed spaces can enhance feelings of identity and safety, thereby influencing users' emotional responses [16]. This emotional aspect is particularly relevant in public buildings, where a positive sense of direction can lead to increased satisfaction and engagement among users.

SOD is a multifaceted construct involving cognitive mapping, spatial memory, and navigational strategies [1]. Research has established that individuals vary significantly in their SOD abilities, with some excelling at spatial tasks and others struggling [2]. For architecture students, proficiency in spatial thinking and navigation is a critical aspect of their skill set, influencing their capacity to design spaces that accommodate human movement and orientation.

Architectural spaces are not merely static environments; they are dynamic systems that interact with human behavior [17]. A poorly designed space can lead to confusion, stress, and inefficiency in navigation, detracting from the overall user experience. Architects must, therefore, possess a nuanced understanding of how individuals perceive and move through space. This understanding is rooted in spatial cognition, which is closely related to SOD.

Architects play a pivotal role in shaping the built environment to ensure it promotes positive spatial experiences for its users. However, designing for effective wayfinding requires not only technical and aesthetic skills but also an innate or cultivated ability to understand and predict spatial interactions—a skill closely tied to SOD.

- *Spatial Abilities and SOD in Architecture Students*

Perhaps the most important characteristic of architecture students is their spatial skills, given that this is a crucial predictor of their success in school and later as professionals. The research found that architecture students exhibited overall greater spatial abilities than students in other fields. These abilities include various cognitive skills such as spatial visualization, mental rotations, directional skills, and the ability to understand and manipulate spatial relationships, for instance, one study has shown that architecture students score higher on spatial ability tests because they are exposed to preparatory experiences before starting their studies, such as Descriptive Geometry [18]. This initial training seems to help improve their spatial reasoning, which is critical to architectural design and visualization.

Furthermore, the effects of educational background on spatial abilities is supported by findings that show students from other relevant educational background, such as interior design actually perform better than general students on spatial skills tasks [19]. This indicates that the curriculum and specialized training in these areas provide the necessary skills and knowledge to develop spatial abilities.

These spatial abilities not only contribute to academic achievement but are also essential for success in numerous fields such as mathematics, engineering, and the natural

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sciences [20]. The ability to visualize and manipulate spatial information is linked to higher achievement in these areas, reinforcing the importance of fostering spatial skills in educational settings. For architecture students, strong spatial abilities not only facilitate better design outcomes but also enhance their problem-solving capabilities in complex spatial tasks [21].

The role that sense of direction (SOD) capabilities play in architecture students is essential for assessing their capacity to conceptualize and design spaces that are intuitive and easy to navigate. Darken and Sibert [22] found that individuals with good spatial abilities are better able to "anticipate potential navigational problems" and /or "to devise solutions". Furthermore, Barkowsky [23] acknowledges that spatial cognition is not only important for solving navigation problems but also a pillar of creativity in architectural design. Architects with strong SOD are better equipped to design spaces that promote intuitive navigation and positive user experiences. For example, Lynch's seminal work [22] on urban design highlights the importance of legibility in creating navigable spaces. Students who understand the principles of wayfinding and possess strong spatial skills are more likely to apply these concepts effectively in their designs. Assessment of the SOD in architecture students helps shed light on their professional potential to design environments that promote seamless wayfinding. This, in turn, develops user experience and allows for positive interactions inside the built spaces that they design.

III. BACKGROUND OF THE STUDY

- *Importance of Sense of Direction in Architecture Education and Practice*

Architecture students need a well-developed sense of direction (SOD), because of the intrinsic demands of their discipline. Architecture is a discipline that operates on a large-scale environment, concerned with the spatial relationship and conceptualizing three-dimensional spaces. These cognitive skills are directly influenced by an individual's spatial navigation abilities, which are fundamental to a strong SOD. It seems to reasonable to believe that architects tend to rely on effective wayfinding, orientation, and mental mapping to create, design, and communicate complex spatial structures.

Beyond classroom learning, professional practice of architecture requires architects to visit sites, and navigate through dense networks of urban and natural processes where their architecture is built. Also, being able to accurately judge distances, memorizing routes, and orient oneself within a space are essential skills for making informed design choices. Thus, SOD is not just a desirable skill but a professional necessity for architects.

- *Influence of Curriculum and Professional Training on Sense of Direction*

It is believed that the curriculum and professional training offered in architectural education further enhance SOD abilities. Pedagogy in architecture focuses on spatial reasoning, locomotor experiences, and visualization of actual physical environments. By working on site visits, urban studies, mapping exercises and tools such as CAD software in class, students develop the capacity to mentally simulate and manipulate spatial information. These experiences may develop heightened awareness of environmental knowledge which can further help SOD to improve.

Fashion design education and practice, on the other hand, do not invest the same level of effort into developing navigation-based skills. Fashion design students tend to study creativity, pattern-making, and material manipulation — all of which are largely based on fine motor skills, aesthetics, and abstract visualization rather than large-scale spatial orientation. So the training architects get could result in improving the SOD levels significantly in comparison to their peers in other disciplines, such as fashion design.

- *Cognitive Differences between Architecture and Fashion Design Students*

Inquiring into SOD measures between architecture students and non-architecture students (such as fashion design students), opens a multi-faceted analysis on the shaping of spatial navigation proficiencies relative to professional disciplines. This makes clear just how much SOD is the product of the demands of education and professional practice rather than aspects of innate ability. Any significant differences found in SOD measures between the two groups aid in understandings of as to what extent professional demands may be beneficial in boosting spatial cognition, especially navigation.

- *Justification for the Study*

This study provides a meaningful contribution to both academic and professional discourse by examining SOD as a crucial skill for architecture students and professionals. By comparing architecture students' SOD measures with those of fashion design students, the research aims to:

- *Validate the Significance of SOD in Architecture Education and Practice.*

The need to compare SOD among students of these disciplines arises from several considerations. First, spatial abilities are not uniformly developed across individuals or disciplines, with differences often shaped by educational training, gender, and prior experiences [25]. By identifying these variations, educators can tailor pedagogical approaches to address specific cognitive needs within each field.

- *Explore how Professional Training Influences Cognitive Abilities, Particularly Spatial Navigation.*

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- *Highlight Differences in Cognitive Demands between Architecture and Fashion Design, Offering Insights into the Role of Education and Practice in Shaping Cognitive Abilities.*

This research contributes to the broader field of cognitive science by examining how spatial abilities manifest in educational contexts. Previous studies have highlighted the malleability of spatial skills through training and experience [26]. By comparing SOD across disciplines, this study provides insights into the impact of design education on spatial cognitive development.

The results of this study are expected to support the argument that SOD is a domain-specific skill significantly influenced by the architectural aptitude and the curriculum of architecture education. Additionally, this research contributes to the broader understanding of how educational and professional contexts shape cognitive development, which has implications for curriculum design across disciplines.

IV. METHODOLOGY

➢ *Research Design and Approach*

This study employed a quantitative research approach to compare the sense of direction between architecture and fashion design students. The research design was cross-sectional, and the data were collected through a questionnaire survey.

The study adopted a comparative design to examine the differences in sense of direction between architecture and fashion design students. The Santa Barbara Sense of Direction (SBSOD) Scale was used to measure the sense of direction among the participants.

➢ *Santa Barbara Sense of Direction Scale (SBSOD Scale)*

Santa Barbara Sense of Direction Scale (SBSOD) was developed by Hegarty et al. in the year 2002. This scale is self-reported that measures individual differences concerning an individual's sense of self-perceived direction or that would determine one's navigating abilities. Higher scores at SBSOD generally relate to good accuracy on the navigation performance coupled with an increase in confidence about the spatial task accomplishment. The scale measures various aspects, such as one's confidence in their ability to orient, use spatial strategies, and the accuracy of mental maps, allowing an individual's spatial orientation abilities to be understood. The scale includes 15 items that are various constructs related to sense of direction as well as specific related abilities to learn routes, understand environmental layout, and orient in the environment and navigating in general. Here, subjects rate statements regarding their self-efficacy for specific tasks on a Likert scale from 1 (Strongly Disagree) to 7 (Strongly Agree). A few of the items in the scale have been reversed scored on their Likert-scales to reduce bias. The total score is derived by adding up the individual ratings of items, and higher scores suggest a higher rating of Sense of Direction. A number of studies have proved that SBSOD is a valid predictor of real-world navigation performance, and it could be useful in research concerning effects of personality traits and cognitive styles in spatial orientation. The SBSOD was highly correlated to other cognitive tests that would measure spatial ability, namely the mental rotation test and tasks under map reading [13].

➢ *Participants and Sampling*

The study comprised 160 participants, consisting of 80 architecture students and 80 fashion design students, all in their mid-years (4th and 6th semester). The participants were selected through convenience sampling, where the researcher visited their institutions and administered the questionnaires. The sample size was determined based on the availability of participants and the feasibility of data collection.

➢ *Data Collection*

Data was collected through a questionnaire containing the 15-item SBSOD Scale. The questionnaire was administered to the participants in person, and they were instructed to complete it anonymously. The data collection process took approximately 20-30 minutes per participant.

➢ *Data Analysis*

The collected data were entered into SPSS (version 23) after proper data preparation and coding. Normality testing was conducted to determine the appropriate statistical analysis. Since the data did not meet the assumptions of normality, non-parametric tests were employed. Specifically, the Mann-Whitney U-test was used to compare the mean ranks of architecture and fashion design students on their SBSOD scores.

Additionally, a Relative Importance Ranking (RII) tool was used to assess the importance given to each of the 15 items within the SBSOD scale. It is a quantitative analysis method extensively used in survey research to convert ordinal data, typically from Likert-scale responses, into a clear index that represents the relative weight or importance of each factor. The RII values are then used to rank the factors, with higher RII values indicating greater relative importance. This method's efficacy lies in its ability to simplify complex data, enabling researchers to effectively prioritize and compare various attributes or elements.

The RII formula involves assigning numerical values to the Likert scale responses, calculating a weighted score for each item, and then deriving an index that reflects the relative importance of each item in relation to others [27].

➢ *For each Factor, the RII is Calculated using the Formula:*

$$RII = \sum W / (A \times N) \quad (1)$$

➢ *Where:*

- $\sum W$ is the total weight assigned to each factor by all respondents (i.e., the sum of the product of each factor's weight and the number of respondents who gave that weight).

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- A is the highest possible weight on the scale (for example, 5 in a 1-5 Likert scale).
- N is the total number of respondents.

The 15-item SBSOD Scale was ranked for the two groups based on the RII scores and the rankings were compared for further interpretation.

V. RESULTS

➢ *Summary of Mann-Whitney U-Test Results:*

The Mann-Whitney U test results that was conducted to compare the Santa Barbara Sense of Direction (SBSOD) scores between architecture students and fashion design students indicate a statistically significant difference in the Santa Barbara Sense of Direction (SBSOD) scores between architecture students and fashion design students (U = 2481.00 , Z = -2.457, p = .014 , r = 0.194) with a small to moderate effect. Architecture students demonstrated higher SBSOD scores, as evidenced by their higher mean rank (89.49) compared to fashion design students (71.51). (See Table 1)

Table 1 Results of Mann-Whitney U-Test between Students of Architecture and Fashion Design on Santa Barbara Sense of Direction Scale

Variable	Group	N	Mean Rank	Sum of Ranks
SBSOD Measures	Architecture	80	89.49	7159.00
	Fashion Design	80	71.51	5721.00
	Total	160		
Mann-Whitney U				2481.000
Wilcoxon W				5721.000
Z				-2.457
Asymp. Sig. (2-tailed)				0.014

➢ *Summary of Results based on Relative Importance Index Scores:*

The results of RII Scores and their ranking are presented in Table No. 2. Architecture students ranked "I am very good at giving directions" (RII: 0.580, Rank: 1) as the most significant skill, emphasizing their abilities of verbal abilities related to spatial communication (See Table 2. for summary of RII scores and ranks).

Fashion design students significantly value thinking in cardinal directions (RII: 0.663, Rank: 1) compared to architecture students (RII: 0.564, Rank: 2). This suggests that fashion design students might rely more on structured frameworks for navigation, indicating a preference for survey and orientation strategies .

Architecture students scored moderately on "I am very good at reading maps" (RII: 0.495, Rank: 9), while fashion design students rated this construct higher (RII: 0.577, Rank: 4). Despite architecture students' profession requiring high spatial visualization, their lower preference for maps might indicate reliance on other spatial tools or mental mapping techniques. Both groups scored similarly in remembering routes (Architecture: RII 0.521, Rank: 5; Fashion Design: RII 0.536, Rank: 6). However, architecture students scored slightly better on maintaining a “mental map” (RII: 0.511, Rank: 6) compared to fashion design students (RII: 0.523, Rank: 8). Fashion design students ranked "I don't remember routes very well while riding as a passenger in a car" relatively high (RII: 0.580, Rank: 3) compared to architecture students (RII: 0.491, Rank: 10). Architecture students rated "I don’t enjoy giving directions" (RII: 0.475, Rank: 12) lower than fashion design students (RII: 0.566, Rank: 5), suggesting differing attitudes toward assisting others in navigation. Both groups scored low on "I enjoy reading maps" (Architecture: RII: 0.452, Rank: 13; Fashion Design: RII: 0.470, Rank: 14), similarly, both groups deemphasize the importance of knowing one's environment, with this item consistently ranked last (Architecture: RII: 0.398, Fashion Design: RII: 0.418).

VI. DISCUSSION

➢ *Mann-Whitney U Test Results:*

The significant difference in SBSOD measures suggests that though the effect size was small to moderate (r = 0.194), architecture students have stronger sense of direction abilities compared to fashion design students. This finding aligns with the expectations of the respective disciplines. Architecture education and practice emphasize spatial reasoning, navigation, and environmental awareness, which are essential for working with large-scale environments. In contrast, the curriculum and professional requirements of fashion design may not emphasize these abilities as prominently, instead focusing on different cognitive and creative skills.

These results reveal the influence of discipline-specific training, education and professional requirements on cognitive abilities, particularly spatial navigation. The small to moderate effect size suggests that while the differences are meaningful, there may also be other factors influencing sense of direction abilities that merit further investigation.

➢ *Relative Importance Index Scores Results:*

Architecture students excelled in tasks requiring an understanding of spatial orientation and cardinal directions, suggesting a higher reliance on orientation and survey strategies for navigation. Fashion students also valued cardinal directions but relied more on external assistance

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(e.g., others or as passengers) rather than directly engaging in navigation.

Architecture students showed relatively low interest in understanding directions or engaging with maps, which may reflect a reliance on acquired spatial strategies rather than depending on external aids like maps. Fashion students also scored low on items related to actively engaging with maps or directions, but their scores are slightly higher than architecture students in these areas. This group also gave higher rankings on "I am very good at reading maps" compared to architecture students suggesting that fashion students might have more confidence in map-reading despite their relatively low enjoyment of maps. This could mean the increased dependence of fashion design students on external aids like maps and signs when engaged in navigation.

Architecture students have slightly better route memory abilities compared to fashion design students. The reason why Architecture students prioritize route memory is more maybe attributed to their exposure to spatially demanding tasks like site visits, urban design, and construction planning, reinforcing its importance in their profession. For fashion design students, while route memory is less professionally relevant, its moderate ranking suggests its utility in daily navigation or general cognitive abilities.

Fashion design students show a stronger preference for relying on external navigational aids, as indicated by their high ranking for items like "I usually let someone else do the navigational planning for long trips" and "I don't remember routes very well while riding as a passenger in a car". These items rank lower for architecture students. Architecture students, on the other hand, demonstrate a stronger sense of independence and spatial judgment, with higher RII scores for items such as "I am very good at giving directions" (RII = 0.580, Rank 1) and "I tend to think of the environment in terms of cardinal directions" (RII = 0.564, Rank 2).

The results align with the demands of the architecture field, which emphasize spatial awareness, understanding of cardinal directions, and an ability to conceptualize and navigate complex environments. Their higher scores for giving directions and thinking in cardinal directions indicate a structured approach to spatial navigation. However, their lower scores on enjoying maps or actively remembering routes suggest that they may rely more on abstract or professional skills in spatial reasoning rather than a personal interest in navigation. Fashion design students, while still demonstrating a good understanding of cardinal directions, appear to rely more on external aids or others for navigation, as seen in their high scores for letting others plan routes and struggling with route memory as passengers. Their higher scores on map-reading, despite low enjoyment, might reflect a functional reliance on tools for navigation, perhaps less integrated into their spatial reasoning than in architecture students.

VII. CONCLUSION

By systematically comparing the sense of direction (SOD) of architecture and fashion design students through the Santa Barbara Sense of Direction (SBSOD) Scale, this research fills a gap in the existing literature. The findings and insights from the study contribute to informing and enhance pedagogical approaches in design education. The findings are significant from both practical and theoretical points of view as it not only broadens the current area of research around spatial cognition in architecture domain offering unique perspectives set in local context such as in Hyderabad, India.

Also, the research supports the reliability and applicability of the SBSOD Scale that has assimilated constructs derived from spatial abilities in large-scale environments. This validation is especially important because it shows that these constructs hold relevance to the professions of architecture and interior design where spatial reasoning and navigation are critical competencies. These results also provide evidence that spatial abilities are not general but are developed and molded based on the expectations of varied professional competencies and work environments.

Emphasizing these discipline-specific demands, the analysis advocates for the adaptation of spatial training and educational practices to the unique cognitive and professional demands characteristic of each design domain. This distinction is important for informing curricula and training programs, as it means educators can target the development of spatial competencies along the axis of these unique demands. Thus, this study complements not only the body of knowledge in pedagogy illuminating spatial perceptual underpinnings but also contributes towards multi-disciplinary collaborations and a broader view introducing spatial aptitude as a factor towards becoming a designer.

In conclusion, this research not only contributes to the understanding of spatial cognition within design education but also opens avenues for interdisciplinary collaboration and a more nuanced approach to fostering spatial abilities in design-related professions.

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Fig 1 Chart showing relative Rank orders for the SBSOD Scale measures for Architecture and Fashion Design Students

Table 2 Summary of Relative Importance Index Scores and Ranks for the items in Santa Barbara Sense of Direction Scale

S.No	Santa Barbara Sense of Direction Items	RII Scores for Architecture	RANK (Architecture)	RII Scores for Fashion Design	RANK (Fashion Design)
1	I am very good at giving directions.	0.580	1	0.518	9
2	I have poor memory for where I left things.	0.541	4	0.534	7
3	I am very good at judging distances.	0.498	7	0.516	11
4	My sense of direction is very good.	0.496	8	0.518	9
5	I tend to think of the environment in terms of cardinal directions. (N, E, W, S).	0.564	2	0.663	1
6	I very easily get lost in a new city.	0.489	11	0.514	12
7	I enjoy reading maps.	0.452	13	0.470	14
8	I have trouble understanding directions.	0.423	14	0.477	13
9	I am very good at reading maps.	0.495	9	0.577	4
10	I don't remember routes very well while riding as a passenger in a car.	0.491	10	0.580	3
11	I don't enjoy giving directions to others.	0.475	12	0.566	5
12	It's not important to me to know where I am (in an environment).	0.398	15	0.418	15
13	I usually let someone else do the navigational planning for long trips.	0.557	3	0.595	2
14	I can usually remember a new route after I have travelled it only once.	0.521	5	0.536	6
15	I don't have a very good ‘mental map’ of my environment.	0.511	6	0.523	8

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